Space Weather Forecast

Issued on Friday, 29 December 2023 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Risk of G1/Minor or perhaps G2/Moderate geomagnetic storm on 29 Dec. Slight chance of R1/Minor Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low with only Common class flares observed, most of these towards the end of the 24 hour period. There are seven sunspot regions on the visible disc, with a developing region in the southeast exhibiting signs of significant magnetic complexity. The largest and most mature in the southwest appears stable with limited signs of activity. All remaining regions appear to be benign or only evolving slowly. No new Earth-directed CMEs (coronal mass ejections) have been observed on available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have been slightly elevated throughout but showed a discontinuity late on 28 Dec due to the arrival of a CME which left the Sun either on 24 or 25 Dec. Total magnetic field strength increased from weak to moderate levels due to the CME, but the north-south component was unremarkable. Geomagnetic activity remained Quiet throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is likely to continue, with a slight chance of Moderate activity.

Solar Wind / Geomagnetic Activity: One of two potential CME arrivals (or a combination of the two) is currently affecting the Earth, with effects likely to continue through much of 29 Dec and perhaps into 30 Dec. Otherwise, a fast solar wind is forecast to connect with Earth either late on 31 Dec or on 01 Jan, giving speeds of 400-500 km/s. Geomagnetic activity will start Quiet with a chance of Active or G1/Minor Storm intervals and a slight chance of G2/Moderate Storm intervals. Activity is then expected to decline to Quiet to Unsettled levels through 30 Dec, but then a risk of further active to G1/Minor Storm intervals late on 31 Dec or on 01 Jan due to the connection with the fast solar wind.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, but there is a very slight chance of reaching S1/Minor Storm levels should there be any larger flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	10	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	15	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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